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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/728,147	11/28/2000	Paul Nadj	SIA-P032	4966

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EXAMINER

MAHMOUDI, HASSAN

ART UNIT	PAPER NUMBER
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2175

DATE MAILED: 04/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/728,147

Applicant(s)

NADJ ET AL.

Examiner

Tony Mahmoudi

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DOV POPOVICI
SUPERVISORY PATENT EXAMINER
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DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 9, 10, and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 9 recites the limitation “remove operation” in line 1. There is insufficient antecedent basis for this limitation in the claim. Correction is required.

Claim 10 recites the limitation “restructure” in line 1. There is insufficient antecedent basis for this limitation in the claim. Correction is required.

Claim 12 is rejected under 35 U.S.C. 112, second paragraph because it is dependent from rejected dependent claim 10.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 1-8 and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Rathbun (U.S. Patent No. 6,138,123.)

As to claim 1, Rathbun teaches a data structure (see column 3, lines 50-53), comprising:
in a heap tree or similar data structure (see column 8, lines 37-40), comprising:
a root level having a node group, the node group having k number of nodes (see figure 30, and see column 19, lines 55-57); and
a second level having one supernode, the supernode having k number of node groups (see figure 33, where “supernode” is illustrated as node **A**, and node groups illustrated as nodes **B** and **C**.)

As to claim 2, Rathbun teaches the structure further comprising one or more holes in arbitrary leaf positions, the one or more holes representing absent values (see column 8, lines 62-65.)

As to claim 3, Rathbun teaches wherein the k number of node groups are siblings of each other in the heap tree such that only one sibling node is needed for any given path in the heap tree (see figure 65, and see column 11, lines 34-37.)

As to claim 4, Rathbun teaches wherein the arrangement of the supernode in the heap tree allows for speculatively reading a children node in the heap tree before an exact desired child node is known (see column 19, lines 55-57, where “reading children node before an exact child is known” is read on “moving right, traveling down, locating 50 and 70 in order to insert 60” as a child.)

As to claim 5, Rathbun teaches wherein the determination of the exact desired child proceeds in parallel with the retrieval of the supernode (see column 4, lines 21-29.)

As to claim 6, Rathbun teaches the structure further comprising a third level having k number of supernodes (see figure 27, where the “third level having k number of supernodes” is illustrated as node H2.)

As to claim 7, Rathbun teaches the structure further comprising a remove or delete operation which does not require a last value to be moved into a root node (see figures 9, 10, and 27, and see column 6, lines 49-63, where “remove or delete operation” is read on “remove() function”.)

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As to claim 8, Rathbun teaches wherein the remove or delete operation comprises:
removing the value from the root node (see column 8, lines 1-10); and
percolating the hole associated with the root node down the heap (see column 8, lines 11-15, where "re-ordering data structure" is discussed.)

As to claim 11, Rathbun teaches the structure further comprising an insert operation for percolating a value to be inserted starting at the root level and proceeding towards the bottom level (see figures 4-6, and see column 6, lines 49-63, where "insert operation" is read on "insert() function".)

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 9-10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rathbun (U.S. patent No. 6,138,123) in view of Klayman (U.S. patent No. 5,463,389.)

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As to claim 9, Rathbun does not teach wherein the data structure contains a hole counter that counts the number of holes below the pointer for one or more of the pointers.

Klayman teaches a data compression method and device utilizing children arrays (see Abstract), in which he teaches wherein the data structure contains a hole counter that counts the number of holes below the pointer for one or more of the pointers (see column 3, lines 49-53, and see column 6, lines 10-19.)

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Rathbun to include wherein the data structure contains a hole counter that counts the number of holes below the pointer for one or more of the pointers.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Rathbun with the teaching of Klayman, because wherein the data structure contains a hole counter that counts the number of holes below the pointer for one or more of the pointers, the system can show the number of empty/available cells within the children arrays so that they may get filled with appropriate children of the same root via the insertion operation.

As to claim 10, Rathbun does not teach wherein the remove operation comprises incrementing by one the hole counter associated with each pointer that is traversed.

Klayman teaches a data compression method and device utilizing children arrays (see Abstract), in which he teaches wherein the remove operation comprises incrementing by one the hole counter associated with each pointer that is traversed (see column 3, lines 45-53,

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where “incrementing the hole counter by 1” is read on “decrementing the child counter of the node”.)

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Rathbun to include wherein the remove operation comprises incrementing by one the hole counter associated with each pointer that is traversed.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Rathbun with the teaching of Klayman, because wherein the remove operation comprises incrementing by one the hole counter associated with each pointer that is traversed, the system can maintain an accurate count on empty, available, or absent cells as well as an accurate count on the number of children/leaves a root/parent node has at any point in time.

As to claim 12, Rathbun as modified teaches wherein an insert operation comprises: percolating a value to be inserted starting at the root level (see Rathbun, column 19, lines 55-67);

in the one or more pointers, each pointer being associated with a hole counter that tracks the number of available holes, percolating the add value down a node in which the hole counter contains a value greater than zero (see Klayman, column 3, lines 49-53, and see column 6, lines 10-19); and

decrementing the selected hole counter by one (see Klayman, column 3, lines 49-53.)

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Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patent is cited to further show the state of art with respect to methods and systems of retrieving and sorting data structures in general:


U.S. Patent No. 6,480,849 to Lee et al, teaching a high-dimensional index structure, consisting of supernodes and node groups.

8. Any inquiries concerning this communication or earlier communications from the examiner should be directed to Tony Mahmoudi whose telephone number is (703) 305-4887. The examiner can normally be reached on Mondays-Fridays from 08:00 am to 04:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dov Popovici, can be reached at (703) 305-3830.

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April 3, 2003


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